TEMPORARY RAMP

BACKGROUND OF THE INVENTION

This invention relates to temporary ramps for use on roadways under construction, wherein the roadways have obstructions such as manhole structures which are temporarily positioned at slightly higher elevations than the existing roadway.

During roadway construction, various structures such as manholes, storm sewer inlets and structures which allow access to water mains are constructed at a raised elevation corresponding to that of the finished roadway. The roadway is then built up such that the surface of the roadway is at the same elevation as the manholes, storm sewers and other structures, resulting in a smooth roadway with all structures being at the proper elevation.

Other roadway construction projects involve removing the top layer of roadway by grinding and then replacing it with a new surface layer. Removal of the top layer of these roadways leaves the structures such as manholes and sewer inlets slightly elevated. These elevated structures are obstructions to automobiles traveling the roadway during the period of time when the top surface is not in place on the roadway.

Similarly, during construction of a roadway the area of road under construction is often at a lower elevation than an adjacent area of roadway. The roadway under construction is eventually raised to the level of the adjacent roadway. But during the period of construction the higher elevation of the adjacent finished roadway is an elevated structure that automobile traffic encounters. This type of elevated structure created by the temporary difference in roadway elevation creates an obstruction to vehicular traffic.

It is known to provide temporary ramps positioned against the edge of the elevated structures so that automobiles may drive up the ramps and over the obstruction. This helps eliminate damage to automobiles as they drive over the elevated structures. One type of ramp is comprised of asphalt that is installed at the edge of the elevated structure and tapers down to the roadway. The installation and removal of this type of temporary ramp involves a variety of machinery and many workers and is therefore a relatively labor intensive and costly process. Also, the asphalt material is only used once and therefore involves disposal of a relatively large amount of waste material.

It is also known to provide elevated structures such as manholes with a single piece temporary ramp that can be placed around the manhole. Some single piece ramps are relatively small and therefore define a relatively steep incline. These steep single piece ramps are therefore best adapted for use in slow traffic areas. These single piece temporary ramps have the advantage of being reusable and therefore eliminate waste. The smallest of these single piece ramps are small enough that they do not require a large number of persons to install or remove them from the manhole. But larger single piece ramps may require more than one person to handle the ramp during installation, removal and transport. Relatively steep ramps are not well adapted for use on elevated manholes in roadways where traffic is moving at higher speeds. Higher speed roadways require a relatively gradual incline on ramps in order to hinder damage to the car as it rides up over the elevated structures.

It would therefore be desirable to provide a temporary ramp that is adapted for use on roadways where traffic moves at relatively high speeds. It would be desirable for such a ramp to have a relatively gradual inclined surface adapted for relatively high-speed roadways. Such a ramp would be relatively large when in place on the roadway next to the elevated structure. It would be desirable for such a temporary ramp to allow a single person to relatively easily install and remove the temporary ramp, even if the ramp is relatively large when in place on the roadway. Such a temporary ramp would therefore not be labor intensive to install or remove. It would also be desirable for such a temporary ramp to involve little or no heavy machinery to install. It would also be advantageous to provide a temporary ramp that is reusable, thereby eliminating waste and reducing the cost of providing temporary ramps during roadway construction.

SUMMARY OF THE INVENTION

The present invention provides a temporary ramp adapted for use on roadways under construction. The roadways have elevated obstructions such as manholes located in the roadway. The temporary ramp includes a plurality of elastomeric ramp segments positioned adjacent each other, each having a lower surface which contacts the roadway when installed and an upper inclined surface that vehicle wheels contact during use. The ramp segments each have at least one edge portion along which each ramp segment is

coupled with an adjacent ramp segment during use. The ramp segments are positionable adjacent the elevated obstruction for allowing vehicles traveling the roadway to ride up and over the elevated obstruction.

The ramp segments are removably coupled together by way of interlocking mating shapes which are formed in abutting edge portions of adjacent ramp segments. The mating shapes comprise male and female shapes which fit together to secure the adjacent ramp segments together when the ramp segments are installed for use on a roadway under construction. The mating shapes extend substantially the entire vertical height of the edge portions of the ramp segments proximate the mating shape. The temporary ramp can be disassembled so that the ramp segments are detached from each other, thereby allowing an operator to handle individual ramp segments. This allows a single operator to assemble and disassemble an entire temporary ramp relatively easily. And the temporary ramp according to the present invention is re-usable so that materials are not wasted.

The ramp segments can be provided with a core of rigid and relatively heavy material such as metal that adds weight to the segment for helping the segment resist shifting that may be caused by forces imparted by vehicles traveling over the temporary ramp.

Hinge mechanisms can be positioned between adjacent edge portions of adjacent ramp segments for allowing the adjacent ramp segments to pivot with respect to one another when removed from the roadway. The hinges allow an operator to fold adjacent ramp segments about the hinge axis to allow an operator to transport the ramp segments relatively easily.

The ramp segments according to the present invention can also include fastener openings through which fasteners can be positioned. Fasteners positioned within the fastener openings can be coupled with the roadway beneath the ramp segments and operatively abut the ramp segments to help the ramp segments resist shifting due to forces transmitted to the ramp segments by vehicles traveling across the temporary ramp. Fasteners such as nails can be placed within the fastener openings and driven into the underlying roadway. The head of the nail will abut a washer or directly abut the top

surface of the ramp segment for helping to secure the ramp segment in place on the roadway.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a top view of a temporary ramp according to the present invention in position around a manhole structure, said temporary ramp having a plurality of ramp segments coupled together by way of mating shapes which interlock.

Figure 2is a top view of a single ramp segment shown in Figure 1 in position adjacent a manhole structure.

Figure 3is a side view of the single ramp segment shown in Figure 2 in position adjacent a manhole structure.

Figure 4 is a top view of a temporary ramp according to the present invention in position around a manhole structure, said temporary ramp having two ramp segments coupled together by way of a hinge mechanism.

Figure 5 is a top view of the temporary ramp of Figure 4 with the segments folded about the axis of the hinge mechanism.

Figure 6 is a side view of the temporary ramp of Figure 4 having a hinge mechanism and in position around a manhole structure.

Figure 7 is a side view of a temporary ramp according to the present invention in position against a butt joint, said temporary ramp having a hinge mechanism which pivotally couples the ramp segments together.

Figure 8 is a top view of a temporary ramp according to the present invention in position against a butt joint, said temporary ramp having mating interlocking shapes which couple adjacent ramp segments together.

Figure 9 is a top view of a pair of ramp segments shown in Figure 7 having a hinge mechanism that pivotally couples the ramp segments together.

Figure 10 is side view of a ramp segment similar to that shown in Figure 7, but with a metal core located within the ramp segment.

Figure 11 is a perspective view of first and second ramp segments according to the present invention having mating shapes which interlock to secure the first and second

ramp segments together when the ramp segments are assembled adjacent a raised structure on a roadway under construction.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Figures 1 - 11, there is shown the preferred embodiment of the present invention. Figures 1 - 3 show a round manhole structure 10 which extends upwardly above the top surface of a roadway 12. The roadway 12 as shown is under construction, and the top layer of roadway has not yet been installed. Therefore the manhole structure 10 temporarily extends above the elevation of the roadway surface 12. The manhole structure 10 creates an obstruction to vehicles traveling the roadway. A temporary ramp 14 according to the present invention is provided for allowing vehicular traffic to smoothly and easily ride up and over the circular manhole structure 10. The temporary ramp 14 shown in Figure 1 includes four ramp segments 16 that can be fitted together to form a single ramp structure 14 around the manhole 10. The ramp segments 16 are made of a material such as plastic, rubber, or high strength composite material.

Each ramp segment 16 shown in Figures 1 – 3 includes edge portions 18 that define mating shapes 20 that interlock to secure adjacent ramp segments 16 together. The mating shapes include male tabs 22 and female openings 24 that fit together in snug fashion for tightly securing adjacent ramp segments 16 together when in place around the manhole structure 10. The mating shapes 20 are defined in the edge portions 18 of the ramp segments 16, and, as best seen in Figure 11, extend the entire vertical height or dimension 26 of the ramp segments 16 in that vicinity. This maximizes the size of the mating shapes 20 to thereby increase the amount of material that absorbs the forces transmitted between mating shapes 20 when the ramp 14 encounters loads associated with a vehicle driving over the ramp 14 and manhole 10. All portions of the mating shapes 20 are as thick as the ramp segment 16 in that location, and therefore the mating shapes 20 utilize a mass of material as thick as the entire vertical height 26 of the segment 16 to maximize the amount of material through which forces are transmitted from one segment 16 to the next. The large size of the mating shapes 20 enhances the strength of the interlocked mating shapes 20, thereby enhancing the ability of the adjacent

ramp segments 16 to withstand the forces transmitted through the mating shapes 20 during operation.

Figure 11 shows first and second ramp segments 28, 30 that have edge portions 18 that abut each other when the temporary ramp 14 is assembled on a roadway 12 under construction. The edge portions 18 are provided with mating shapes 20 which interlock to secure the first and second ramp segments 28, 30 together when assembled on a roadway 12. The mating shapes 20 include a bulbous portion 32 connected via a neck portion 34 to the first ramp segment 28. An opening 36 defined in the edge portion 18 of the second ramp segment 30 corresponds to the shape of the bulbous portion 32 and neck 34. The bulbous portion 32 and neck 34 are tightly received in the opening 24 for securing the first and second ramp segments 28, 30 together. The opening 24 is defined by the full vertical height 26 of the second ramp segment 30 in that location, and the bulbous portion 32 and neck 34 extend the entire vertical dimension 26 of the first ramp segment 28 in that location.

The ramp 14 shown in Figures 1 - 3 is formed of four interlocking segments 16 which can be assembled and disassembled by an operator. Since the ramp 14 can be broken down into a plurality of relatively small segments 16, a single operator can relatively easily handle the segments 16 and carry them to and from a transport vehicle or truck. Furthermore, a single operator can easily manipulate the relatively small segments 16 during assembly of the ramp 14 around a manhole 10. The ramp segments 16 are therefore a manageable size that allows a single operator to transport, manipulate, assemble and disassemble a relatively large ramp 14. Preferably the ramp segments 16 are large enough that they extend radially outwardly from the manhole 10 a relatively large distance such that they define a relatively gradual slope or ramped surface well adapted for relatively high speed roadways. If such a ramp were a single unitary structure, a single operator may not be capable of handling such a large structure. Such a unitary structure might also be too large to fit in conventional vehicles such as a pickup truck. But the ramp 14 according to the present invention is divided into interlocking segments 16 so that a single operator can disassemble and assemble the ramp 14 relatively easily, and so that the segments 16 easily fit within the width of the bed of a conventional pickup truck, for example.

The ramp segments 16 can also be provided with fastener holes 38 that allow an installer to attach fasteners 40 such as nails through the holes 38 and into the underlying pavement 12. A washer 42 can be placed around the nail 40 before being driven. Once the nail 40 is driven into the underlying pavement 12 in this manner the head of the nail 40 abuts the washer 42, which abuts the top surface 44 of the ramp segment 16. The nail 40 and washer 42 help secure the segment 16 in place as vehicular traffic drives over the temporary ramp 14. Figure 2 shows in phantom a single fastener opening 38 positioned in the ramp segment 16 adjacent the manhole 10, and a pair of fastener openings 38 positioned in each ramp segment 16 adjacent the radially outer edge 46 of the segment 16.

The ramp segments 16 can be provided with a 1:20 incline. For a manhole 10 that extends 1.75 inches above the existing roadway surface 12, the segment 16 would extend radially 30 inches from the manhole 10. The radially outer edge 46 of the segment is approximately .25 inches high.

Referring now to Figures 7 - 10 there is shown a temporary ramp 14 according to the present invention adapted for use against a straight edge 48 of an obstruction, otherwise known in the construction field as a butt joint. Figure 7 shows the surface of a roadway 12 under construction. A top surface layer (not shown) will be installed on top of the lower surface 12 shown. A finished roadway surface 50 is shown adjacent to the portion of the roadway 12 under construction. The temporary ramp 14 is utilized for allowing vehicular traffic on the roadway 12 to drive from the finished roadway surface 50 to the lower surface 12, and vice verse, without causing damage to the vehicle. The ramp 14 is positioned in close abutment with the drop-off or edge 48 of the finished surface 50 to provide a relatively smooth transition between the upper and lower surfaces 50 and 12.

The temporary ramp 14 shown in Figures 7 - 10 includes numerous ramp segments 16 that all fit together to form an assembled temporary ramp14. The edges 18 of the ramp segments 16 include mating shapes 20 that fit together to securely couple the segments 16 together after assembly. The mating shapes 20 include male shapes 22 and female shapes 24 that fit snuggly together. The mating shapes 20 extend the entire vertical dimension of the edge of the segment 16, and thereby provide a relatively large

amount of material through which forces can be dispersed. The mating shapes 20 are formed on the lateral outer edges 52 of the segments 16 for securing the segments 16 across the width of the roadway 12. The temporary ramp 14 shown in Figure 8 also includes mating shapes 20 formed in the laterally extending edges 54 of the segments 16 to securely couple the adjacent segments 16 together that are aligned in the direction of vehicle travel. The temporary ramp 14 shown in Figures 7 and 9 are provided with hinge mechanisms 62 which coupled the laterally extending edges 54 together. The segments 16 are assembled together to form a ramp 14 having the proper width desired. Outer ramp segments 56 can be provided having a smooth outer edge 58 with no mating shape formed therein. Ramp segments 16 having different widths can be provided to allow a person to assemble the temporary ramp 14 in varying widths depending on the widths of the segments used. Ramp segments 16 are also coupled together to form a relatively long ramp 14 in the direction of vehicle travel, which allows the slope of the ramp 14 to be relatively gradual and is well adapted for use on high-speed roadways. The segments 16 are detachable from each other to allow a single person to disassemble the temporary ramp 14 and easily load the individual ramp segments 16 into a vehicle such as a pickup truck.

Referring now to Figure 10, there is shown an alternative embodiment of the present invention. The temporary ramp segment 16 shown in Figure 10 includes a core 60 of a metal material such as steel or iron. The metal core 60 is relatively heavy, and therefore serves to increase the weight of the segment 16. A temporary ramp 14 assembled of segments 16 having metal cores 60 such as this are relatively heavy, which can be advantageous for maintaining the temporary ramp 14 in position when relatively high speed traffic drives over the ramp 14. The higher speed traffic tends to impart larger impact loads to the temporary ramps 14, and therefore the heavier weight of the temporary ramp 14 with the metallic cores 60 is well adapted to resist these impact loads and hold the ramp 14 in the proper position.

Referring now to Figures 4, 5, 6, 7 and 9, there is shown temporary ramps 14 which include a hinge mechanism 62 that allows adjacent ramp segments 16 to be folded at the axis of the hinge 62. The folded ramp segments 16 are relatively compact for easy handling by a person assembling or disassembling a temporary ramp 14.

Figure 4, 5 and 6 shows a temporary ramp 14 designed for use around a raised manhole structure 10. The hinge mechanism 62 allows the temporary ramp 14 to be folded about the axis of the hinge 62 to thereby decrease the size of the temporary ramp 14 to facilitate handling. The folded temporary ramp 14 will more readily fit into common vehicles such as into the bed of a conventional pickup truck. The hinge mechanism 62 can be attached to the segment 16 by a belt splice type of joint or other suitable means.

Figures 7 and 9 show a temporary ramp 14 that is designed to extend across the width of a roadway 12 against a linear butt joint 48. The hinge mechanisms 62 couple ramp segments 16 together that are adjacent each other and aligned with the direction of vehicle traffic. These adjacent ramp segments 16 can be folded about the axis of the hinge mechanism 62 to thereby make the segments 16 easy to handle by a person assembling, disassembling or transporting the temporary ramp 14. Mating shapes 20 are provided between laterally adjacent ramp segments 16 to secure the ramp segments 16 together when installed on the roadway 12.

All the ramp segments 16 shown in the drawing figures can be provided with fastener openings 38 similar to those shown in phantom in Figure 2. These fastener openings 38 help further secure the temporary ramps 14 and individual segments 16 against movement as impacts and other loads are encountered when vehicle traffic drives over the temporary ramps 14.

The temporary ramps 14 adapted for use against a linear surface or butt joint 48 as shown in Figures 7 - 10 can be manufactured having an upper surface 44 that is inclined approximately 1:20, or as little as 1:80 for use on higher speed roadways.

The temporary ramps 14 shown in Figures 1 - 11 can be manufactured in colors such as red, orange or yellow to increase their visibility to oncoming drivers and thereby warn them of the approaching variation in roadway.